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Opportunities and challenges while conducting field trips to the museum: a narrative review

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ABSTRACT

The museum visit field trip engages and motivates the children in various activities. Field trips to the museum provide the students with a constructivist and experiential learning environment as they construct knowledge through observing the artifacts. The present study describes the possible opportunities and challenges for school children while conducting field trips to the museum. The study employed a narrative review technique to address the research question raised. The study selected the literature reviews from 2012-2023, including studies on field trips to the museum for the academic engagement of school children. The data includes 50 peer-reviewed journal articles categorized into five categories: students' overall development, experiential learning opportunities, the museum as a resource, the role of teachers, the school, and museum authority. Results revealed that the museum is a resource for learning and is perfect for improving students' cognitive and affective development towards the various school subjects and helping them enhance their participatory learning opportunities. However, teachers' knowledge, infrastructure, parental consent, and legitimization with the school authority are some challenges in conducting museum visit field trips. Future research may focus on conducting empirical studies, which include school-museum collaboration, to enhance the horizon of school and community knowledge.

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1. INTRODUCTION

The museum serves as a venue for experiential learning [1]. Exhibits in museum galleries allow children to learn subject content meaningfully through observation [2]. Studies have shown that students become more enthusiastic about learning history after visiting museums [3]. Field trips to museums help students understand geography [4]. Visits to the museum have significantly increased students' motivation in science subjects [5]. The museum visit creates an experiential learning environment [6]. Additionally, observation of the artifacts displayed in the museum facilitates inquiry-based learning [7]. However, it is crucial to mention that visitors are more attracted if the museum objects are displayed excitingly [8]. Therefore, descriptive labeling of museum objects significantly impacts visitors' cognitive and emotional experiences [9]. Integrating technology with the museum setting helps to make museum visit experiences more engaging and interactive [10]. Integrating virtual museums into classrooms could facilitate teaching and learning [11]. The study shows that museum visits are also helpful in improving the well-being of people with dementia [12]. A museum is a social venue, so inclusivity in museum settings is essential [13]. Therefore, to make the museum visit inclusive and comfortable for children with disability, museum management needs proper training [14].

Previous research has described various scopes of museum visits. Despite the vast scope and immense educational importance of the museum visit, an adequate number of studies are needed in India. It has also been found that teachers face many challenges when organizing museum visits for students [15]. Effective collaboration between schools and museums can help teachers overcome these challenges [16]. Therefore, based on the earlier studies, the study aims to identify and describe the possible opportunities and challenges of conducting field trips to museums worldwide. The study addresses the following research question: what are the possible opportunities and challenges in implementing a worldwide field trip to museums for school children? The findings discuss museum visits as a global pedagogical practice in school education.

2. METHOD

The study followed a narrative literature review approach [17], [18], synthesizing 50 peer-reviewed journal articles from ProQuest (N=25), Core (N=15), Science.gov (N=8), and Semantic Scholar (N=2). The articles were selected based on the keywords "museum visit" OR "field trip" AND "teachers' perception," which were limited to the English language and published between 2012-2023. Only articles with full text availability were chosen. The research question helped the sorting process for identifying the most relevant sources for this study. Most selected articles (N=15) articles describe the role of the teachers in museum visits (7, 9, 11, 15, 20, 22, 26, 30, 38, 40, 41, 42, 45, 49, 50). The other (N=13) studied museum as a resource (1, 2, 6, 10, 14, 16, 17, 23, 28, 31, 32, 44, 46). The overall development of the students was studied in (N=9) articles (5, 12, 21, 24, 27, 33, 36, 43, 47). The category of experiential learning (N=7) was also studied (3, 10, 13, 19, 24, 25, 37) and some articles (N=6) describing the role of school and museum authority (4, 8, 18, 29, 35, 39). Table 1 contains the articles selected for narrative review [19]–[68].

The selected articles as shown in Table 1 were reviewed and monitored thoroughly according to the research question framed. The selected article presents the opportunities and challenges to conduct field trips to museums. Each article was identified, and qualitative data-based content analysis was applied to themed the article into a table [69] as a detailed document analysis was conducted [70]. Through inductive categorization, the opportunities and challenges of museum visits were divided into subcategories, which were named separately [71]. Finally, five categories were framed, and those subcategories were incorporated to give a detailed description of the opportunities and challenges of the field trip to the museum.

Table 1. Selected articles for narrative review

SN	Study	SN	Study	SN	Study	SN	Study	SN	Study
1	[19]	11	[29]	21	[39]	31	[49]	41	[59]
2	[20]	12	[30]	22	[40]	32	[50]	42	[60]
3	[21]	13	[31]	23	[41]	33	[51]	43	[61]
4	[22]	14	[32]	24	[42]	34	[52]	44	[62]
5	[23]	15	[33]	25	[43]	35	[53]	45	[63]
6	[24]	16	[34]	26	[44]	36	[54]	46	[64]
7	[25]	17	[35]	27	[45]	37	[55]	47	[65]
8	[26]	18	[36]	28	[46]	38	[56]	48	[66]
9	[27]	19	[37]	29	[47]	39	[57]	49	[67]
10	[28]	20	[38]	30	[48]	40	[58]	50	[68]

SN=serial number

3. RESULTS AND DISCUSSION

The opportunities and challenges of implementing field trips to the museum were categorized into five categories: students' overall development, experiential learning opportunities, museum as a resource, role of teachers, and role of school and museum authority. In Table 2, the opportunities and challenges of each category are specified by subcategories. Each article is assigned to one category.

3.1. The overall development of the students

The students' overall development category in the museum visit created two subcategories of opportunities: cognitive development and affective development. Regarding cognitive development, it revealed that field trips can positively impact students' knowledge retention on environmental subjects [21]. Science learning becomes more effective with augmented reality in science museums [24]. Regular visits to museums positively affect young children's cognitive development [27]. López-Fernández *et al*. [33] found that student knowledge of disaster preparedness increased considerably with the museum visit. Students' understanding of microbiology becomes concrete by visiting the museum [47].

Affective development of the students is the other subcategory that comes under the overall development. Study by Yildirim [5] emphasized that collaboration between teachers, art councils, and museums positively impacts students' skills in the subject of art. Other studies [12], [21] mentioned the impact of field trips on students' attitudes. Students develop a positive attitude toward cultural heritage education using virtual museums. Along with this, students can develop a positive attitude towards environmental subjects. Museum visits can foster student personality development through language learning [36]. The development of aesthetic sense in the museum environment is another positive opinion of the children [43]. Out-of-class activities also create positive intercultural sensitivity among the students [48].

Table 2. Categories of opportunities and challenges

Categories of museum visit	Opportunities of museum visit	Challenges of museum visit
Students' overall development	Cognitive	
	Affective	
Experiential learning	Hands on learning	Hands on learning
	Innovative learning experiences	Logistics problem
Museum as a resource	Educational agency	Lack of initiative to train teachers
	Mode of learning	Lack of infrastructure
	Method of learning	
Role of teachers	Teachers' knowledge	Teachers' knowledge
	Teachers' perception	Teachers' perception
Role of school and museum authority	Collaboration	Infrastructure
		Legitimization

3.2. Experiential learning

In this category, hands-on learning and innovative learning are the two subcategories under opportunities. Regarding hands-on learning activities, using interactive technologies through multi-touch applications in museums promotes a higher user experience rate than traditional guided tours [25]. This hands-on museum activity is a practical tool for retaining the subject content knowledge [10]. Material objects, demonstrations, and the inclusion of technology in museum settings evoked an experiential learning environment for the museum visitors [37]. In terms of opportunities, the museum provides innovative learning experiences. Study by Kisida *et al*. [3] focuses on introducing mini educational game facilities in museums to enhance students' visits to the museums. This mini-educational game series helps the students learn different abstract artistic concepts. Study by Abril-López *et al.* [19] mentioned that through collaboration, science museums can facilitate mathematics learning. Augmented reality in science museums is an innovative approach to bringing better results in science learning for students [24]. Regarding challenges, the study by Gómez-Hurtado *et al*. [13] focuses on biology students facing some challenges on field trips. The absence of field labs and logistics is their biggest challenge.

3.3. Museum as a resource

The museum as a resource contains three subthemes in terms of opportunities: i) museum as an educational and cultural agency; ii) learning modes; and iii) learning method. Study by Andre *et al*. [2] examines how museums act as a perfect venue for interaction, which offers emotional and mental space to exchange ideas. Social media can also contribute to museum experiences. It has been found that museum visitors expressed their positive emotions by interacting with artwork through Instagram through memes or paintings [23]. The number of followers of museums on social media also represents the sources of online value of museums [32]. Students' possibility thinking features are also nurtured through alternative learning resources such as museums [28].

The second subtheme related to the mode of learning is categorized as opportunity. A study [14] revealed that museums offered different learning modes to determine students' engagement in science. Paper-based and technology-based learning trails positively affect students' engagement in science centers. Museum websites also represent various online learning pedagogies that act as opportunities [17].

The third subtheme is related to the learning method. Incorporating augmented reality and virtual reality in museum settings positively affects academic achievement in science, arts, and history learning [31]. In addition, the incorporation of technology in museum settings acts as a mediating tool between visitors' experience and the museum environment [44]. Storytelling to engage the visitors' interest is another positive dimension of the museum as a resource [34]. Study by Gregoriou [46] recommends introducing 3D printing technology in the museum to make it enjoyable and accessible for blind and partially sighted visitors. Museum content can become more engaging with the introduction of game-based learning methods [6], [16], which can support the active learning strategy in museum settings. Implementing smart objects in museum settings generates positive interaction.

However, it has some challenges. Especially in middle and low-income countries, this concept of game-based learning in a museum setting has yet to be highly popularized. The lack of proper infrastructure to facilitate game-based learning in museums is the main challenge that can be noted. Another challenge mentioned is that the museum authority needs to take more initiative to train the pre-service teachers. In this study by Rugaiyah [1], the result revealed that early childhood pre-service teachers showed a slight improvement in the inquiry-based learning approach from an outdoor experience at the museum visit; however, from the social science point of view, there is a lack of educational initiative by the museum authority for the early childhood pre-service teachers. Another challenge is that gamification in museum settings is recurred with high maintenance. The online museum has a wide range of learning resources, but teaching learning materials requires upgradation [17]. In addition, online museum resources may only be handy for those skilled in the digital world.

3.4. Role of teachers

The category of the role of teachers in the museum visit created two subcategories regarding opportunities and challenges. First, regarding teachers' knowledge, Lertpradit [7] mentioned that teachers can use guidebooks related to out-of-school learning environments. It has been found that Denizli's OSLEG is the appropriate guidebook, which is mapped according to the unit and subject learning outcomes and which teachers can use for out-of-school learning environments. In the study Okumuş and Vurgun [11], prospective teachers viewed integrating museum education practice with virtual teaching as effective in teaching social science subjects. Another study [15] mentioned prospective teachers' views on heritage education. The study revealed a specificity of knowledge of the trainee teachers of early childhood education and awareness of the values of the heritage of trainee teachers of primary education. Second, regarding teachers' perception, a study [20] revealed that teachers agreed that field trips should be educational rather than recreational by using local heritage sites. Other studies [22], [26] mentioned that teacher candidates opined that museums provide better learning opportunities for the students by seeing the objects. Study by Ismaeel and Al-Abdullatif [30] indicates pre-service teachers' positive thinking about museum pedagogy. Similarly, other studies [38], [40] indicate pre-service teachers' positive attitudes toward aesthetic values through virtual museum visits and the inclusion of museums and heritage education in the primary school curriculum.

Teachers' knowledge and perceptions were also analyzed in terms of challenges. Research by Castellotti *et al*. [9] states that teachers use different activities during field trips to museums. However, these are not reflective activities for educational purposes. However, El-Batri *et al*. [15] states that despite knowing cultural heritage, there is little awareness of how to link heritage and the present situation among trainee teachers. In terms of teachers' perception, teachers face difficulties in taking the students on the field trip because of the lack of consent from the parents due to economic cost factors. Pre-service teachers viewed that, as most museums are fee-paying, students are not ready to pay, resulting in fewer students' participation. It may be difficult for the teachers to control the overcrowded class, and students can damage the artifacts unconsciously [22]. In addition, teachers viewed that effective planning and time management are the basic requirements to make the museum visit effective and meaningful [49]. Scaffolding becomes difficult because of the teachers' lack of confidence and the several constraints faced during the field trip to the museum [41]. Learning opportunities in museums may help the teachers to grow positive awareness and perception towards inclusivity in museum education [42]. The study recommends engaging pre-service teachers with the museums in context to understand the importance of museums in teaching and learning circumstances [45]. In addition, there is a requirement for proper training regarding informal education for in-service teachers [50].

3.5. Role of school and museum authority

This category was sub-themed into collaboration in terms of the opportunities. Two studies [4], [8] focus on recommendations for collaboration. The study by Arı [4] recommends how collaboration acts as an opportunity for teachers and natural history museum authorities to effectively educate students about the history of evolution. It also sheds light on how museums act as an active agency to orient the teachers regarding preparing the students for a visit to the Natural History Museum to learn about evolution. The study also provides a thorough guide on how teachers can collaborate to eliminate obstacles in informal science education. Study by Pallud [8] focuses on the purpose of the school visits to museums. Both teachers and museum educators agreed that the primary purpose of school visits to museums is academic perspective, knowledge enhancement, and cultural experiences. The study by Pallud [8] recommends proper collaboration between schools and museums to sort out the issue and convince educational agents about visiting archaeological museums to study history. Milutinović and Selaković [35] recommends proper training for museum educators to ensure a large number of students' participation in field trips to museums. Similarly, study by Schmäing and Grotjohann [39] suggests a robust school-museum collaboration for successful content and language-integrated learning in museum settings.

In terms of challenges, the subthemes are infrastructure and legitimacy. Regarding infrastructure, study by Lindfors *et al*. [18] points out a lack of critical thinking on gender issues regarding the use of materials in science centers for pedagogical activities; most materials used are masculinized. Regarding legitimacy, it might be challenging to convince educational agents to visit archaeological museums to study history [8]. The study by Islek and Danju [29] focuses on the lack of time and financial constraints, which are the main factors that hinder school and museum collaboration.

This narrative review aimed to identify and describe possible opportunities and challenges in implementing field trips to museum visits for school children. Table 2 represents the categories that analyze the opportunities and challenges regarding students' overall development, experiential learning, the museum as a resource, the role of teachers, and the role of school and museum authority. It was found that museum visits enhance students' learning outcomes in various subjects, such as art and science, and help improve retention capacity [39], [42]. The findings are supported by a study that says that children can learn the subject content meaningfully by observing the artifacts [2]. Visiting museums has been shown to generate optimistic attitudes toward the subjects [23], [30], [39], [72]. Museums offer hands-on learning activities and innovative learning opportunities. Introducing game-based learning and augmented reality in a museum setting can provide experiential learning opportunities for students [21], [28], [37], [42], which is supported by a recent study [6]. Museums serve as a resource for visitors to exchange ideas and express positive emotions [20], [41]. Additionally, museums provide a perfect venue for implementing active learning strategies [34], [73]. The result gets its support from a recent study [7]. Online learning pedagogies offered by museums present great opportunities for teaching and learning; however, the material provided on online platforms needs to be upgraded [35].

Furthermore, there is a need for additional educational initiatives from museum authorities to train teachers [19]. When analyzing the role of teachers, it was found that teachers believe that museums provide better learning opportunities for students [40]. Teachers have found that field trips to museums should have an educational focus rather than being solely for recreational purposes [38]. To ensure an effective museum visit, teachers can utilize a proper guidebook to conduct the visit [25]. However, teachers only occasionally promoted museum visits because they lacked an awareness of connecting cultural heritage with the present situation. Furthermore, teachers needed to learn to use different types of reflective activities for educational purposes [27]. This is supported by a recent study which suggests that museum management should receive proper training [14]. Since most museums charge entry fees, obtaining parental consent poses a challenge for teachers. Additionally, managing large class sizes is another challenge teachers face when organizing museum visits [40]. This finding is consistent with a study that reveals teachers encounter several challenges when facilitating museum visits for students [15]. After examining the roles of school and museum authorities, the results indicated that a collaborative effort between the school and museum would be beneficial in guiding students and teachers during museum visits. This finding is supported by a recent study which suggests that school-museum collaboration would help address the challenges faced by teachers [16]. However, museum artifacts can sometimes exhibit gender bias, which can create problems during pedagogical activities [36]. Securing legitimacy with educational authorities poses a challenge when organizing museum visits [26]. Additionally, financial and time constraints are other factors hindering successful field trips to museums [47].

This narrative review has some limitations. Firstly, it is based on 50 peer-reviewed journal articles found using four search engines, which may only encompass some available literature. Secondly, the present narrative review focuses on the worldwide opportunities and challenges of school-based museum visits. The research on opportunities and challenges of museum visits for undergrad and post-grad students was not studied. In this narrative review, we only selected full-text peer-reviewed journals, but the research on museum visits published in book chapters, reports, and other sources was not included in this present narrative review. We mainly selected the articles that were under the coded themes. Hence, to provide an even more complete overview of opportunities and challenges of museum visits, future review studies may include the literature that aligns with the exclusion criteria of the present narrative review. Expanding the search to include literature from various sources and search engines could enhance the review's comprehensiveness.

3.6. Implications of the findings

The present narrative review of 50 peer-reviewed journal articles implies that the museum has immense potential to cater to the student's academic engagement. Museums also provide scope for experiential learning environments. In addition, museum visits generate the overall development of the students. However, despite the innumerable benefits of museum visits, conducting a successful visit has several challenges. Therefore, to address these challenges, schools and educational policymakers may develop guidelines to facilitate the smooth conducting of museum field trips. The study recommends school-museum collaboration as an effective method to train the pre-service and in-service teachers to understand the importance of museum visits in teaching and learning circumstances.

4. CONCLUSION

This present narrative review states that the museum is a perfect venue for learning. The field trip to the museum would help in pedagogical practices for school students. Carrying out a museum visit would benefit students' overall development and enhance their experiential learning opportunities. However, teachers face some challenges while conducting museum visits for the students. School-museum's collaborative approach can address these issues. This study was conducted on 50 peer-reviewed research articles. Narrative review methodology was applied to search the articles to collect the data, which were categorized in authentic phrases from the search results of the studies. The study recommends the inclusion of museum visit pedagogy in pre-service and in-service teachers' course curricula. Empirical study on the effect of school-museum collaboration on students' academic performance is open for future research.

REFERENCES

[1] R. Rugaiyah, "Experiential learning through field trips: an overview," *AL-ISHLAH: Jurnal Pendidikan*, vol. 14, no. 4, pp. 6255–6266, Oct. 2022, doi: 10.35445/alishlah.v14i4.1972.

[2] L. Andre, T. Durksen, and M. L. Volman, "Museums as avenues of learning for children: a decade of research," *Learning Environments Research*, vol. 20, no. 1, pp. 47–76, Apr. 2017, doi: 10.1007/s10984-016-9222-9.

[3] B. Kisida, L. Goodwin, and D. H. Bowen, "Teaching history through theater: the effects of arts integration on students' knowledge and attitudes," *AERA Open*, vol. 6, no. 1, p. 233285842090271, Jan. 2020, doi: 10.1177/2332858420902712.

[4] Y. Arı, "Fieldwork in geography undergraduate degree programmes of Turkish Universities: status, challenges and prospects," *Journal of Geography in Higher Education*, vol. 44, no. 2, pp. 285–309, Apr. 2020, doi: 10.1080/03098265.2019.1698016.

[5] H. İ. Yildirim, "The effect of using out-of-school learning environments in science teaching on motivation for learning science," *Participatory Educational Research*, vol. 7, no. 1, pp. 143–161, Feb. 2020, doi: 10.17275/per.20.9.7.1.

[6] R. Cherian and G. S. Prakash, "Reflexivity through experiential learning in social work education: implications for signature pedagogy," *Journal of Social Work Education and Practice*, vol. 7, no. 4, pp. 17–26, 2022.

[7] J. Lertpradit, "The role of geographical fieldwork in social studies education program: the comparative studies in Thailand," *Special Education*, vol. 2, no. 43, pp. 3256–3260, 2022.

[8] J. Pallud, "Impact of interactive technologies on stimulating learning experiences in a museum," *Information & Management*, vol. 54, no. 4, pp. 465–478, Jun. 2017, doi: 10.1016/j.im.2016.10.004.

[9] S. Castellotti *et al.*, "Psychophysiological and behavioral responses to descriptive labels in modern art museums," *PLOS ONE*, vol. 18, no. 5, p. e0284149, May 2023, doi: 10.1371/journal.pone.0284149.

[10] Z. Gong, R. Wang, and G. Xia, "Augmented reality (AR) as a tool for engaging museum experience: a case study on Chinese art pieces," *Digital*, vol. 2, no. 1, pp. 33–45, Feb. 2022, doi: 10.3390/digital2010002.

[11] O. Okumuş and A. Vurgun, "Pre-service history teacher's opinions about the use of virtual museum applications in history courses," *Education Quarterly Reviews*, vol. 4, no. 2, pp. 122–137, Jun. 2021, doi: 10.31014/aior.1993.04.02.204.

[12] A. Schall, V. A. Tesky, A.-K. Adams, and J. Pantel, "Art museum-based intervention to promote emotional well-being and improve quality of life in people with dementia: the ARTEMIS project," *Dementia*, vol. 17, no. 6, pp. 728–743, Aug. 2018, doi: 10.1177/1471301217730451.

[13] I. Gómez-Hurtado, J. M. Cuenca-López, and B. Borghi, "Good educational practices for the development of inclusive heritage education at school through the museum: a multi-case study in Bologna," *Sustainability*, vol. 12, no. 20, p. 8736, Oct. 2020, doi: 10.3390/su12208736.

[14] M. C. Chiscano and A. I. Jiménez-Zarco, "Towards an inclusive museum management strategy. An exploratory study of consumption experience in visitors with disabilities. The case of the Cosmocaixa science museum," *Sustainability*, vol. 13, no. 2, p. 660, Jan. 2021, doi: 10.3390/su13020660.

[15] B. El-Batri, A. Alami, M. Zaki, and Y. Nafidi, "Extracurricular environmental activities in Moroccan middle schools: opportunities and challenges to promoting effective environmental education," *European Journal of Educational Research*, vol. 8, no. 4, pp. 1013–1028, 2019, doi: 10.12973/eu-jer.8.4.1013.

[16] K. Poom-Valickis, E. Eve, and A. Leppiman, "Creating and developing a collaborative and learning-centred school culture: views of Estonian School Leaders," *Center for Educational Policy Studies Journal*, vol. 12, no. 2, pp. 217–237, Sep. 2021, doi: 10.26529/cepsj.1029.

[17] H. Snyder, "Literature review as a research methodology: an overview and guidelines," *Journal of Business Research*, vol. 104, pp. 333–339, Nov. 2019, doi: 10.1016/j.jbusres.2019.07.039.

[18] E. Lindfors, M.-L. Rönkkö, L. Kiviranta, V. Yliverronen, S. Tanhuanpää, and S. Grönman, "Outdoor learning in early childhood education: a narrative review," *Techne Series - Research in Sloyd Education and Craft Science A*, vol. 28, no. 2, pp. 156–165, 2021.

[19] D. Abril-López, H. Morón-Monge, M. D. C. Morón-Monge, and M. D. López Carrillo, "The learning to learn competence in early childhood preservice teachers: an outdoor and e/m-learning experience in the museum," *Future Internet*, vol. 13, no. 2, p. 25, Jan. 2021, doi: 10.3390/fi13020025.

[20] F. S. Berlekamp, "Museum – meeting points," *Opuscula Musealia*, vol. 27, pp. 67–81, 2021, doi: 10.4467/20843852.OM.20.004.13743.

[21] B. Bossavit, A. Pina, I. Sanchez-Gil, and A. Urtasun, "Educational games to enhance museum visits for schools," *Educational Technology and Society*, vol. 21, no. 4, pp. 171–186, 2018.

[22] G. Branch and W. E. Meikle, "Taking students to the museum: interview with Warren D. Allmon, Judy Diamond, and Martin Weiss," *Evolution: Education and Outreach*, vol. 5, no. 1, pp. 123–127, Mar. 2012, doi: 10.1007/s12052-012-0408-z.

[23] L. Corbisiero-Drakos, L. K. Reeder, L. Ricciardi, J. Zacharia, and S. Harnett, "Arts integration and 21st century skills: a study of learners and teachers," *International Journal of Education and the Arts*, vol. 22, no. 2, pp. 1–26, 2021, doi: 10.26209/ijea22n2.

[24] M. Ćosović and B. R. Brkić, "Game-based learning in museums-cultural heritage applications," *Information*, vol. 11, no. 1, p. 22, Dec. 2019, doi: 10.3390/info11010022.

[25] Ü. G. Durukan, D. Batman, and A. Aslan, "The analysis of middle school science course contents of out-of-school learning environment guidebooks," *Bartın Üniversitesi Eğitim Fakültesi Dergisi*, vol. 11, no. 3, pp. 517–542, Oct. 2022, doi: 10.14686/buefad.990199.

[26] A. Escribano-Miralles, F.-J. Serrano-Pastor, and P. Miralles-Martínez, "Perceptions of educational agents regarding the use of school visits to museums for the teaching of history," *Sustainability*, vol. 13, no. 9, p. 4915, Apr. 2021, doi: 10.3390/su13094915.
[27] A. Escribano-Miralles, F.-J. Serrano-Pastor, and P. Miralles-Martínez, "The use of activities and resources in archaeological museums for the teaching of history in formal education," *Sustainability*, vol. 13, no. 8, Apr. 2021, doi: 10.3390/su13084095.
[28] M. Galizzi, "Bringing Adam Smith's pin factory to life: field trips and discussions as forms of experiential learning," *Journal of the Scholarship of Teaching and Learning*, vol. 14, no. 5, pp. 27–47, Nov. 2014, doi: 10.14434/12938.
[29] D. Islek and I. Danju, "The effect of museum education practices carried out on virtual teaching environments on prospective teachers' views," *Revista de Cercetare si Interventie Sociala*, vol. 67, pp. 114–135, Dec. 2019, doi: 10.33788/rcis.67.8.
[30] D. A. Ismaeel and A. M. Al-Abdullatif, "The impact of an interactive virtual museum on students' attitudes toward cultural heritage education in the region of Al Hassa, Saudi Arabia," *International Journal of Emerging Technologies in Learning (iJET)*, vol. 11, no. 4, pp. 32–39, Apr. 2016, doi: 10.3991/ijet.v11i04.5300.
[31] K. A. Treibergs, D. Esparza, J. A. Yamazaki, and M. K. Smith, "Journal reflections shed light on challenges students face in an introductory field biology course," *Ecosphere*, vol. 14, no. 4, p. e4509, Apr. 2023, doi: 10.1002/ecs2.4509.
[32] W. Leister, I. Tjøstheim, G. Joryd, J. A. Andersson, and H. Heggelund, "Strengthening engagement in science understanding with learning trails," *Multimodal Technologies and Interaction*, vol. 3, no. 3, p. 48, Jul. 2019, doi: 10.3390/mti3030048.
[33] J. A. López-Fernández, S. Medina, M. J. López, and R. García-Morís, "Perceptions of heritage among students of early childhood and primary education," *Sustainability*, vol. 13, no. 19, p. 10636, Sep. 2021, doi: 10.3390/su131910636.
[34] A. López-Martínez, Á. Carrera, and C. A. Iglesias, "Empowering museum experiences applying gamification techniques based on linked data and smart objects," *Applied Sciences*, vol. 10, no. 16, p. 5419, Aug. 2020, doi: 10.3390/app10165419.
[35] J. Milutinović and K. Selaković, "Pedagogical potential of online museum learning resources," *Journal of Elementary Education*, vol. 15, pp. 131–145, Aug. 2022, doi: 10.18690/rei.15.Spec.Iss.131-145.2022.
[36] C. Rodéhn, "Science centres, gender and learning," *Cultural Studies of Science Education*, vol. 14, no. 1, pp. 157–167, Mar. 2019, doi: 10.1007/s11422-018-9880-2.
[37] J. Roldán-Zafra and C. Perea, "Math learning in a science museum—proposal for a workshop design based on STEAM strategy to learn mathematics. The case of the cryptography workshop," *Mathematics*, vol. 10, no. 22, 2022, doi: 10.3390/math10224335.
[38] M. Sánchez-Fuster, P. Miralles-Martínez, and F.-J. Serrano-Pastor, "School trips and local heritage as a resource in primary education: teachers' perceptions," *Sustainability*, vol. 15, no. 10, p. 7964, May 2023, doi: 10.3390/su15107964.
[39] T. Schmäing and N. Grotjohann, "Out-of-school learning in the Wadden Sea: the influence of a mudflat hiking tour on the environmental attitudes and environmental knowledge of secondary school students," *International Journal of Environmental Research and Public Health*, vol. 20, no. 1, p. 403, Dec. 2022, doi: 10.3390/ijerph20010403.
[40] S. Uslu, "Teacher candidates' opinions about the use of museums as educational environments in social studies lessons," *International Journal of Education and Literacy Studies*, vol. 9, no. 1, pp. 33–43, Jan. 2021, doi: 10.7575/aiac.ijels.v.9n.1p.33.
[41] S. Vlachou and M. Panagopoulos, "An examination of classical art impact and popularity through social media emotion analysis of art memes and museum posts," *Information*, vol. 13, no. 10, p. 468, Sep. 2022, doi: 10.3390/info13100468.
[42] S. Yoon, E. Anderson, J. Lin, and K. Elinich, "How augmented reality enables conceptual understanding of challenging science content," *Educational Technology and Society*, vol. 20, no. 1, pp. 156–168, 2017.
[43] P. Zaharias, D. Michael, and Y. Chrysanthou, "Learning through multi-touch interfaces in museum exhibits: an empirical investigation," *Educational Technology and Society*, vol. 16, no. 3, pp. 374–384, 2013.
[44] M. Karnezou, D. Pnevmatikos, S. Avgitidou, and P. Kariotoglou, "The structure of teachers' beliefs when they plan to visit a museum with their class," *Teaching and Teacher Education*, vol. 99, p. 103254, Mar. 2021, doi: 10.1016/j.tate.2020.103254.
[45] F. Tan, X. Gong, and M. C. Tsang, "The educational effects of children's museums on cognitive development: empirical evidence based on two samples from Beijing," *International Journal of Educational Research*, vol. 106, p. 101729, 2021, doi: 10.1016/j.ijer.2020.101729.
[46] M. Gregoriou, "Creative thinking features and museum interactivity: examining the narrative and possibility thinking features in primary classrooms using learning resources associated with museum visits," *Thinking Skills and Creativity*, vol. 32, pp. 51–65, Jun. 2019, doi: 10.1016/j.tsc.2019.03.003.
[47] L. Vermeersch and A. Vandenbroucke, "Schools and cultural organisations natural partners in art and cultural education (ACE)?" *Procedia - Social and Behavioral Sciences*, vol. 116, pp. 1032–1039, Feb. 2014, doi: 10.1016/j.sbspro.2014.01.341.
[48] J. Hubbard and O. M. Odebiyi, "Examining elementary social studies preservice teachers' dispositional thinking about museum pedagogy," *The Journal of Social Studies Research*, vol. 45, no. 4, pp. 227–239, Oct. 2021, doi: 10.1016/j.jssr.2021.05.001.
[49] Y. Zhou, J. Chen, and M. Wang, "A meta-analytic review on incorporating virtual and augmented reality in museum learning," *Educational Research Review*, vol. 36, p. 100454, Jun. 2022, doi: 10.1016/j.edurev.2022.100454.
[50] A. Padilla-Meléndez and A. R. del Águila-Obra, "Web and social media usage by museums: online value creation," *International Journal of Information Management*, vol. 33, no. 5, pp. 892–898, Oct. 2013, doi: 10.1016/j.ijinfomgt.2013.07.004.
[51] E. MacDonald, V. Johnson, M. Gillies, and D. Johnston, "The impact of a museum-based hazard education program on students, teachers and parents," *International Journal of Disaster Risk Reduction*, vol. 21, pp. 360–366, Mar. 2017, doi: 10.1016/j.ijdrr.2017.01.010.
[52] G. W. L. Soerjoatmodjo, "Storytelling, cultural heritage and public engagement in AkhirPekan@ MuseumNasional," *Procedia - Social and Behavioral Sciences*, vol. 184, pp. 87–94, May 2015, doi: 10.1016/j.sbspro.2015.05.057.
[53] J. M. Tigert, G. Fotouhi, and S. Kirschbaum, "An investigation of museum educators' questioning during field trips," *Learning, Culture and Social Interaction*, vol. 31, p. 100571, Dec. 2021, doi: 10.1016/j.lcsi.2021.100571.
[54] K. Kalamees-Ruubel and U. Läänemets, "Teaching literature in and outside of the classroom," *Procedia - Social and Behavioral Sciences*, vol. 45, pp. 216–226, 2012, doi: 10.1016/j.sbspro.2012.06.558.
[55] L. Jin, H. Xiao, and H. Shen, "Experiential authenticity in heritage museums," *Journal of Destination Marketing & Management*, vol. 18, p. 100493, Dec. 2020, doi: 10.1016/j.jdmm.2020.100493.
[56] T. Kafadar, "Virtual museum experiences of pre-service social studies teachers in the process of forming aesthetic values: Pera museum example," *International Online Journal of Education and Teaching (IOJET)*, vol. 9, no. 4, pp. 2148–2225, 2014.
[57] F. Fazzi, "Stakeholders' perceptions over the integration of CLIL and museum education and methodological implications," *Educazione Linguistica Language Education*, vol. 9, no. 3, pp. 407–436, 2020, doi: 10.30687/ELLE/2280-6792/2020/03/005.
[58] P. Brett, "'The sacred spark of wonder': local museums, Australian curriculum history, and pre-service primary teacher education: a Tasmanian case study," *Australian Journal of Teacher Education*, vol. 39, no. 6, pp. 17–29, Jun. 2014, doi: 10.14221/ajte.2014v39n6.8.
[59] J. M. Tigert and S. Kirschbaum, "How museum teachers scaffold emergent bilingual learners' meaning-making during field trips," *Journal of Museum Education*, vol. 44, no. 4, pp. 439–447, Oct. 2019, doi: 10.1080/10598650.2019.1673114.

[60] C. Kanari and A. Z. Souliotou, "The role of museum education in raising undergraduate pre-service teachers' disability awareness: the case of an exhibition by disabled artists in Greece," *Higher Education Studies*, vol. 11, no. 2, pp. 99–119, Mar. 2021, doi: 10.5539/hes.v11n2p99.
[61] C. Annechini, E. Menardo, R. Hall, and M. Pasini, "Aesthetic attributes of museum environmental experience: a pilot study with children as visitors," *Frontiers in Psychology*, vol. 11, p. 508300, Oct. 2020, doi: 10.3389/fpsyg.2020.508300.
[62] A. Recupero, A. Talamo, S. Triberti, and C. Modesti, "Bridging museum mission to visitors' experience: activity, meanings, interactions, technology," *Frontiers in Psychology*, vol. 10, p. 2092, Sep. 2019, doi: 10.3389/fpsyg.2019.02092.
[63] N. Lemon and S. Garvis, "Perceptions of pre-service teachers value of art museums and galleries," *Journal of Museum Education*, vol. 39, no. 1, pp. 28–41, Mar. 2014, doi: 10.1179/1059865013Z.00000000042.
[64] H. Karaduman, Ü. Alan, and E. Ö. Yiğit, "Beyond 'do not touch': the experience of a three-dimensional printed artifacts museum as an alternative to traditional museums for visitors who are blind and partially sighted," *Universal Access in the Information Society*, vol. 22, no. 3, pp. 811–824, Aug. 2023, doi: 10.1007/s10209-022-00880-0.
[65] T. J. McGenity *et al.*, "Visualizing the invisible: class excursions to ignite children's enthusiasm for microbes," *Microbial Biotechnology*, vol. 13, no. 4, pp. 844–887, Jul. 2020, doi: 10.1111/1751-7915.13576.
[66] S. Öztürk and U. Akcil, "The views of school leaders regarding gaining universal values in socio-cultural trips," *Frontiers in Psychology*, vol. 13, p. 1033058, Sep. 2022, doi: 10.3389/fpsyg.2022.1033058.
[67] N. Uzel, "Opinions of prospective biology teachers about 'outdoor learning environments': the case of museum visit and scientific field trip," *Participatory Educational Research*, vol. 7, no. 2, pp. 115–134, Aug. 2020, doi: 10.17275/per.20.23.7.2.
[68] M. Karnezou, S. Avgitidou, and P. Kariotoglou, "Links between teachers' beliefs and their practices in a science and technology museum visit," *International Journal of Science Education, Part B*, vol. 3, no. 3, pp. 246–266, Nov. 2013, doi: 10.1080/21548455.2013.773467.
[69] K. Krippendorff, *Content analysis: an introduction to its methodology*, 4th ed. Thousand Oaks, CA: SAGE Publications, Inc., 2019, doi: 10.4135/9781071878781.
[70] G. A. Bowen, "Document analysis as a qualitative research method," *Qualitative Research Journal*, vol. 9, no. 2, pp. 27–40, Aug. 2009, doi: 10.3316/QRJ0902027.
[71] S. Elo, M. Kääriäinen, O. Kanste, T. Pölkki, K. Utriainen, and H. Kyngäs, "Qualitative content analysis," *SAGE Open*, vol. 4, no. 1, p. 215824401452263, Jan. 2014, doi: 10.1177/2158244014522633.
[72] G. S. Prakasha, R. Sangeetha, S. M. Almeida, and A. Chellasamy, "Examining university students' attitude towards e-learning and their academic achievement during COVID-19," *International Journal of Information and Education Technology*, vol. 12, no. 10, pp. 1056–1064, 2022, doi: 10.18178/ijiet.2022.12.10.1720.
[73] G. S. Prakasha, "Active learning and student engagement in Indian teacher education," in *Handbook of Research on Active Learning and Student Engagement in Higher Education*, J. Keengwe, Ed. IGI Global, 2022, pp. 227–245, doi: 10.4018/978-1-7998-9564-0.ch011.

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